

## **REMARKS**

Claims 1-53 and 55-77 are pending in this application. Claims 1-33, 36, 38, 40, 42 and 44 are withdrawn as belonging to a non-elected invention and/or species. Claims 34, 35, 37, 39, 41, 43, 45-53 and 55-57 have been rejected under 35 U.S.C. § 103. Claim 34 has been to further clarify the invention, specifically to specify that the first and second light intensities are different. Support for this amendment may be found at, e.g., Figure 3.

Applicants request withdrawal of the rejections based on remarks that follow.

### **35 U.S.C. § 103 Rejections**

Claims 34, 35, 37, 39, 41, 43, 45-48, 52, 53 and 55-57 have been rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 6,756,085 to Waldfried et al. (“Waldfried”) in view of U.S. Patent Publication No. 2002/0064341 to Fauver et al. (“Fauver”). Claims 49-51 has been rejected under 35 U.S.C. § 103 as being unpatentable over Waldfried in view of Fauver and further in view of U.S. Patent Publication No. 2002/0141024 to Retschke et al. (“Retschke”). Applicants respectfully traverse these rejections.

The methods of the present invention involve a UV curing process in which the intensity of the UV radiation is modulated (e.g., oscillating) to produce high strength films. This described by claim 34, which recites in part:

“(a) exposing the dielectric film to ultraviolet radiation with a first light intensity during a first time increment;

(b) exposing the dielectric film to ultraviolet radiation with a second light intensity during a second time increment, wherein the first and second light intensities are different; and

(c) repeating (a) and (b) in a manner that provides modulated ultraviolet radiation exposure that significantly increases the hardness and modulus of the dielectric film.”

As described in the specification, providing modulated or oscillating UV radiation as compared to continuous UV exposure result in stronger films with fewer deleterious effects. Specifically, films exposed to modulated UV radiation experience less film shrinkage, less increase in dielectric constant, and higher mechanical strength (page 12, col. 4-8). In order to provide the modulated UV, the film is exposed to multiple cycles of the first and second intensities exposure increments. A graphical example of the modulated UV is depicted in Figure 2, which shows repeated cycles of the higher and lower intensity exposure periods. In

various embodiments described in the specification, the film is exposed to multiple cycles of the modulated UV – in specific examples, 3 cycles (90 seconds total exposure ) or 6 cycles (180 seconds total exposure).

The claimed invention recognizes the significance of providing modulated UV and specifically of 1) using two different UV light intensities and 2) repeating the first intensity/second intensity UV cycle in order to provide the modulated UV. These features are not taught by the references either alone or in combination.

Waldfried describes a single cycle UV cure process to improve the hardness and elastic modulus of a dielectric. In certain embodiments, after the cure process, the film may undergo a second UV exposure to remove unwanted polar species generated by the initial UV cure process (col. 8, lines 46-54).

With regard to operation (c) of the claimed invention, the Examiner states that Waldfried fails to disclose the repeated use of UV curing but that “Fauver et al. disclose the use of multiple applications to change the properties of the material (paragraph 0132).” The Examiner concludes that it would be obvious to combine the teachings of Fauver with Waldfried to reach the claimed invention.

Applicants disagree with this conclusion. Fauver relates to micro-fabricated waveguide scanners. In the paragraph identified by the Examiner, Fauver states:

The method of micro-fabrication can include single and repeated applications of UV-cure or heat-cure optical adhesives of various amounts, refractive indices, viscosities, hydrophobicities, adhesion properties, etc. (paragraph 0132)

First, “repeated” appears to modify the application of the adhesive and not the UV-cure, i.e., Fauver does not teach that multiple applications of UV radiation change the material properties, but that multiple applications of the adhesive (each of which may be cured with UV) may be used in the scanner fabrication. After application, the particular dose of the adhesive may be cured with UV and the entire application/cure process may occur multiple times, but there is no teaching or suggestion of using repeated UV cure steps on the same material.

Thus, none of the references alone or in combination teach or suggest operation (c) of the claimed invention.

Applicants also submit that the effect of UV on an optical adhesive is not relevant to UV cure of dielectric materials. The chemistries and applications of adhesives and porous dielectrics are significantly different such that one of skill in the art would not be motivated to combine these references in the manner the Examiner suggests.

Finally, even if one were to repeat the two UV exposure operations in Waldfried, there is no teaching or suggestion that the UV intensities at these operations would differ. As described above, the present invention recognizes the significance of providing modulated UV. Waldfried describes the same range of UV intensities for both operations (0.1 – 2000 mW/cm<sup>2</sup>) and is silent on the relative intensities during each of these exposure periods. There is no teaching or suggestion that these intensities be different as is required by the present claims. Without such a suggestion, one of skill in the art would likely use the same intensity UV for purposes of convenience.

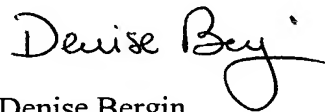
Applicants also submit that various dependent claims are independently patentable. Claim 48, for example, recites that the modulated UV is supplied by a single source. Modulated UV radiation can be achieved using any of a number of techniques. In the embodiment of claim 48, one UV radiation source that is capable of providing modulated UV intensities, is used. There is no teaching or suggestion of such a source in Waldfried.

For at least the reasons given above, Applicants submit that independent claim 34 and its dependent claims are patentable over the cited art and request that the Examiner withdraw these 35 U.S.C. § 103 rejections.

### **Conclusion**

Applicants believe that all pending claims are allowable and respectfully request a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Respectfully submitted,  
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